with maps

METHOD

(14)

OF DETERMINING

THE FOCAL DISTANCE OF SINGLE OR COMBINED LENSES.

by

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As a means of quickly determining the focal distance of a lens, instead of the present methods, which, when exact, are slow, and, when speedy, are uncetrain. I beg to propose the following :—

Having chosen two cylindrical lenses, the one convex and the other concave, whose coefficients of refraction and focal distances have been determined to be exactly the same, mount them as a Stokes' lens according to the arrangement shown, and calculate exactly according to the usual formula, the power which each glass obtains as it revolves upon the other, placing the amount in the different national inches used, and also according to the metre measurement on the handle, or on a disc at the other end of the handle, and so arranging that the indicator points to each of those as it is moved.* By placing a diaphragm with three apertures bored at a distance of one and a half millimetres from the centre of one to the centre of the other ⋰ or ⋱,—or with five apertures in one diaphragm ⁙, against the Stokes so denined, we have an instrument which, I believe, will serve the purpose.†

Placing the lens whose focal distance it is required to determine, in close contact with the Stokes, and looking through the apertures spoken of at a small point of light, the movement of the indicator will cause the two eccentric lights, seen by the self-made Ametrop, to approach the centre light, but not to coalesce with it. The point at which they stand nearest to each other (the same point at which the lights would have amalgamated had they not been placed obliquely to the vertical and horizontal axes of the Stokes)—that is, when they are in one horizontal or vertical line according as the glass so determined is a convex or a concave lens, and which is the position where the refraction of the axis of the glass examined is neutralised by the Stokes, will give the focal distance of the glass.

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* Glasses of stronger power than those used by Stokes will probably be preferred.

† The distances of the apertures from each other must vary according to the size of the pupil of the observer. I find 1½ to 2 mm. from the centre of one to the centre of the other—a convenient distance for most pupils.

If a diaphragm with five apertures is used, it will save the trouble of turning the diaphragm in relation to the axis of the Stokes when determining different kinds of lenses ; and the movements of the different eccentric points will also tell the kind of glass examined, or which predominates, when a combination of glasses is used.

The rapidity with which this may be done, the ease with which a practitioner may determine the focal distance of his test-glasses according to any measurement, and the fact that we may shortly be asked to determine all our glasses according to the metre measurement, will, I think, cause this method to be acceptable to ophthalmologists.

W. LAIDLAW PURVES.

Brussels, 22*nd April* 1873.